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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,403	09/20/2005	Andrew John Whitehead	266456US6PCT	7068

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EXAMINER	
BAKER, DAVID S	
ART UNIT	**PAPER NUMBER**
2884	

NOTIFICATION DATE	DELIVERY MODE
07/17/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/526,403	WHITEHEAD, ANDREW	
	Examiner	Art Unit	
	David S. Baker	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-47 and 49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 05 April 2007 has been accepted and entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 26-47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu (US 5,773,839 A) in view of Nam (US 5,527,565 A).

Regarding claim 26, Lu discloses a method of detecting radiation comprising: providing a layer of CVD diamond having an electron mobility measured at 300K greater than 2400 $cm^2V^{-1}s^{-1}$ (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45); and applying an electric field of .02V/μm (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45); exposing the layer to radiation thereby generating a signal (F:2, C:1 L:15 thru C:2 L:12,

C:3 L:49 thru C:6 L:45); and detecting the signal (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45). Lu does not disclose expressly that the CVD diamond layer is a single crystal CVD diamond layer. Nam discloses a diamond radiation detector comprising a detection layer of single crystal CVD diamond (C:2 L:15-35). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a single crystal diamond detection layer due to the single crystal structure's higher thermal conductance over a polycrystalline structure thereby allowing the detector to operate in a wider range of temperatures.

Regarding claims 27-29, Lu discloses applying an electric field of .02V/μm (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45).

Regarding claims 30-31, Lu discloses that the diamond layer has a thickness of less than 500μm (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45).

Regarding claim 32, Lu and Nam disclose the claimed invention but do not disclose expressly that the thickness of the layer is less than 250μm. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to make the diamond layer less than 250μm. The motivation for doing so would have been to decrease the size of the detector making it more compactable resulting in better portability.

Regarding claim 33-36, Lu discloses that the bias voltage may be as lower as 6.16V.

Regarding claims 37-39, Lu and Nam disclose the invention except for the CVD diamond layer reaching at least 80%, 90%, or 95% of saturated charge collection

efficiency at the applied electric field. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the CVD diamond layer reach at least 80%, 90%, or 95% of saturated charge collection efficiency at the applied electric field, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 40-43, Lu and Nam disclose the claimed invention except for the CVD diamond layer being capable of generating at least 7000, 9000, 12000, or 15000 electrons per detection event at the applied electric field. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the CVD diamond layer being capable of generating at least 7000, 9000, 12000, or 15000 electrons per detection event at the applied electric field, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 44, Lu discloses that the radiation may be alpha particles (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45). Additionally, Lu and Nam disclose the claimed invention for the CVD diamond layer being such that it generates a peak width (FWHM) in energy of less than 20%, expressed as $\delta E/E$. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the CVD diamond layer being such that it generates a peak width (FWHM) in energy of less than 20%, expressed as $\delta E/E$, since it has been held that discovering an optimum value of a

result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 45-46, Lu discloses that the radiation may be nuclear particles (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45).

Regarding claim 47, Lu discloses a radiation detector comprising: a layer of CVD diamond configured to operate at an electric field of .02V/μm (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45); and having an electron mobility measured at 300K greater than 2400 $cm^2V^{-1}s^{-1}$ (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45). Lu does not disclose expressly that the CVD diamond layer is a single crystal CVD diamond layer. Nam discloses a diamond radiation detector comprising a detection layer of single crystal CVD diamond (C:2 L:15-35). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a single crystal diamond detection layer due to the single crystal structure's higher thermal conductance over a polycrystalline structure thereby allowing the detector to operate in a wider range of temperatures.

Regarding claim 49, Lu discloses that the diamond layer has a thickness of less than 1mm (F:2, C:1 L:15 thru C:2 L:12, C:3 L:49 thru C:6 L:45).

Response to Arguments

5. Applicant's arguments with respect to claims 26-47 and 49 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

WO 99/64892 – Sussmann discloses a CVD diamond radiation detector.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Baker whose telephone number is (571) 272-6003. The examiner can normally be reached on MTWRF 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSB

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